Executive Summary

SUVs are marketed to consumers as a safe and rugged alternative to the station wagon. The reality, however, is that automakers have offered consumers unsafe SUVs that place a heavy burden on both pocketbooks and the environment.

In 2002, 42,815 people lost their lives in U.S. highway fatalities—the highest level since 1990. SUVs and pickups accounted for more than 60 percent of the increase. At the same time, the fuel economy of light trucks (SUVs, pickups, and minivans) fell to its lowest level since 1981, forcing the average light truck owner to pay more than $11,000 for gasoline over the life of the vehicle. This poor fuel economy contributes to a growing dependence on oil, rising imports, and a transportation sector that emits more global warming emissions than most countries release from all sectors combined.[1]

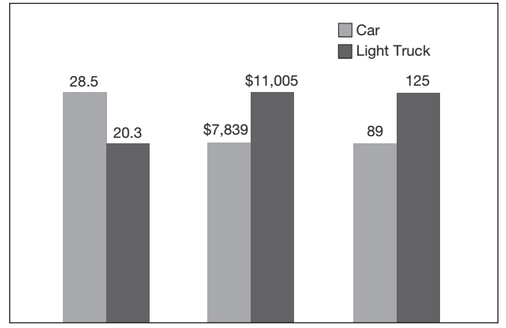
Consumers want and deserve better. This report provides a blueprint for using existing technologies to build a better SUV—one that can save lives, money, and gasoline while providing consumers with the same size and performance they have today.

Fuel Economy and Pollution Loopholes

SUV sales increased by a factor of 20 between the early 1980s and 2002, and now represent one out of every four new car sales in the United States. Despite the dramatic rise in light truck sales and their primary use as passenger vehicles rather than work vehicles, SUVs, pickups, and minivans are allowed to meet a much lower fuel economy standard than cars.

As a result, the average light truck's fuel economy was about 30 percent lower than the average car in 2002 (Figure ES-1). This translates into nearly $3,200 more spent on gasoline over the truck's life, assuming a conservative gas price of $1.40 per gallon. In addition, the average model year (MY) 2002 light truck produced 40 percent more emissions of the heat-trapping gases that cause global warming and roughly 1.5 to 5 times more nitrogen oxide emissions (a key smog-forming pollutant) than cars.

Figure ES-1 **Lifetime Impact of the Average Model Year 2002 Car and Light Truck**



NOTES:
a. CAFE test fuel economy is from Hellman and Heavenrich, 2003.
b. Lifetime fuel cost based on: average gasoline price of $1.40 per gallon; 15-year average vehicle lifetime; annual mileage of 15,600 in the first year, declining by 4.5% per year; and real discount rate of 5% (equivalent to an 8% new car loan). On-road fuel economy assumed to be 18% below CAFE test value.
c. Lifetime global warming gas emissions presented as carbon dioxide equivalent emissions from the vehicle tailpipe (19 pounds/gallon) and from gasoline manufacturing and delivery (5 pounds/gallon). Emissions from manufacturing, refrigerant leaks, and other sources are not included. Emissions are based on the same vehicle lifetime and mileage estimates used to calculate lifetime fuel cost.

1 Only the United States, China, Russia, and Japan have higher total emissions from all sectors.

Safety Pitfalls

Consumers may perceive SUVs to be safer than cars, but the overall fatality rate for SUVs was actually eight percent worse than cars in 2000. Furthermore, in single-vehicle accidents resulting in rollovers, the fatality rate for SUVs rises to nearly three times that for cars (Figure ES-2). Rollover fatalities in SUVs and pickups accounted for the majority of the increase in all occupant fatalities in 2002.

SUVs and pickups also drive up the fatality rates in other vehicles because of their heavy, stiff frames, which act like battering rams in collisions with other vehicles. The added height of SUVs and pickups makes matters worse by allowing the truck to ride up over a car's bumper, negating many of that vehicle's safety features. Despite these problems, neither the government nor the automakers have established standards or taken significant steps to reduce rollovers and make SUVs less dangerous to others on the road.

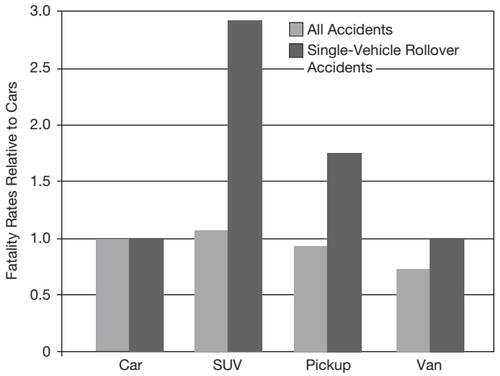
Building a Better SUV

Building a better SUV means offering consumers a vehicle they will want to buy—one that saves lives, money, and gasoline while providing the same performance they have come to expect. To demonstrate the safety and fuel economy potential of light trucks, the Union of Concerned Scientists developed a blueprint for a new SUV. This blueprint relies on improvements that could be made using existing safety and fuel economy technologies, all of which are on the road today in the United States, Europe, or Japan.

The UCS Guardian

The UCS Guardian and UCS Guardian XSE were designed to have the same size and acceleration as the most popular SUV in the United States today, the 21 miles per gallon (mpg) Ford Explorer. The Guardians were also designed to have the same or improved hauling capacity. Both vehicles accelerate from 0 to 60 mph in about nine seconds and have even better hill-climbing ability than the Explorer.

Figure ES-2 **Relative Fatality Rates for Cars and Light Trucks (2000)**



SOURCE: Fatality data from NHTSA, 2001. Registration data from The Polk Company.

The Guardian achieves a fuel economy rating of 27.8 mpg by using a better engine, improved tires and aerodynamics, and a stronger but lighter unibody frame. Together, these technology improvements increase the price of the SUV by $600 but pay for themselves in a little more than two years. Over the course of the vehicle's life, Guardian owners would save more than $2,500 on gasoline.

The two most important safety improvements in the Guardian are an effective seat belt reminder system for all passengers and a sensor that activates the seat belt pretensioner to keep occupants firmly in their seats if the vehicle does roll over. Other safety improvements include making the vehicle lower and wider so it will be less likely to roll over in the first place, and implementing crush zones that make it less of a danger to others on the road. Together, these changes cost less than $140 and would save more than 2,200 lives every year if all SUVs on the road used them.

The Guardian XSE achieves better than 36 mpg by adding an even more efficient engine, along with an efficient six-speed automatic transmission and more extensive use of high-strength steel and aluminum to reduce its weight. These improvements cost $2,315, but still pay for themselves in 5.4 years and cut the vehicle's lifetime gasoline cost by more than $4,300.

Added safety improvements include an electronic stability control system that uses a computer to help keep the vehicle from rolling over, and window curtain air bags that provide additional protection if the vehicle does roll over. These technologies cost only $645 and would save more than 2,900 lives every year if all SUVs on the road used them.

Building Better Cars and Light Trucks

For the past 15 to 20 years, automakers have focused on building bigger and more powerful cars and trucks, and consumers now have vehicles with plenty of size and hauling power. But they also have vehicles that fail to provide the safety and fuel economy Americans want and deserve.

The technologies we used to design a better SUV can also be incorporated into cars, minivans, and pickups to give consumers better choices. Light trucks with these improvements could match the current fuel economy standard for cars (27.5 mpg) by MY 2008, cutting our oil use by 800,000 barrels per day in 2015. Putting all of these technologies to work in both cars and trucks would result in safer highways and new vehicles that could reach 40 mpg by 2014. This would increase U.S. oil savings to two million barrels per day in 2015.

Automakers have the necessary technologies in hand to spend the next decade and beyond focused on saving thousands of lives and billions of dollars at the pump every year. The UCS Guardian and UCS Guardian XSE provide a blueprint for a better SUV that can deliver these benefits without forcing consumers to sacrifice the size and performance they have today.

Ford Explorer XLT

Engine
4-liter V6, 210 hp

Transmission
5-speed automatic

Body
standard aerodynamics
standard tires
body-on-frame construction
4,500 pounds

Performance
0-60 mph in 8.9 seconds
18% hill grade at 50 mph

Safety
rollover rating: 2 out of 5 stars (2WD)
basic minimal safety features

Costs and Savings

MSRP:	$29,200
Lifetime Fuel Cost:	$10,538
Total Cost:	$39,738
fuel economy payback:	*n/a*
lifetime net savings:	n/a

Annual Fatality Reduction (All SUVs)

occupant life savings:	n/a
non-occupant life savings:	n/a

Lifetime Emissions

global warming gases:	119 tons

Fuel Economy (MPG)

21.2 CAFE Test — **18.0 EPA Adjusted**

UCS Guardian

Engine
3.1-liter VTEC V6, 225 hp

Transmission
5-speed automatic

Body
improved aerodynamics
low-resistance tires
unibody construction
4,100 pounds

Performance
0-60 mph in 8.9 seconds
25% hill grade at 50 mph

Safety
rollover rating: 5 out of 5 stars
stronger roof, better seat belts,
improved crash absorption

Costs and Savings

MSRP:	$29,935
Lifetime Fuel Cost:	$8,036
Total Cost:	$37,971
fuel economy payback:	*2.1 years*
lifetime net savings:	$1,767

Annual Fatality Reduction (All SUVs)

occupant life savings:	1,925
non-occupant life savings:	350

Lifetime Emissions

global warming gases:	91 tons

Fuel Economy (MPG)

27.8 CAFE Test — **23.6 EPA Adjusted**

UCS Guardian XSE

Engine
2.3-liter stoich-GDI V6, 170 hp

Transmission
6-speed automatic, no torque converter

Body
improved aerodynamics
low-resistance tires
unibody construction
3,150 pounds

Performance
0-60 mph in 8.9 seconds
22% hill grade at 50 mph

Safety
rollover rating: 5+ out of 5 stars
stronger roof, better seat belts, window curtain air bags, electronic stability control, improved crash absorption

Costs and Savings

MSRP:	$32,160
Lifetime Fuel Cost:	$6,154
Total Cost:	$38,314
fuel economy payback:	*5.4 years*
lifetime net savings:	$1,424

Annual Fatality Reduction (All SUVs)

occupant life savings:	2,550
non-occupant life savings:	>350

Lifetime Emissions

global warming gases:	70 tons

Fuel Economy (MPG)

36.3 CAFE Test — **30.7 EPA Adjusted**